

## CLAIMS

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent is:

1. A UV-curable adhesive composition comprising:  
a vinyl-ether terminated urethane; and  
a poly-functional mercaptan.
2. The UV-curable adhesive composition, according to claim 1, wherein said urethane is synthesized from at least one polyester polyol and at least one aliphatic diisocyanate.
3. The UV-curable adhesive composition, according to claim 1, wherein said urethane has a molecular weight,  $\langle M_n \rangle$ , in the range of 1000 to 50,000, more preferably 2000 to 12,000 and most preferably 3000 to 7000.
5. The UV-curable adhesive composition, according to claim 1, wherein said polyol has a molecular weight in the range of from about 1000 to about 3200 AMU.
6. The UV-curable adhesive composition, according to claim 1, wherein said diisocyanate is selected from the group consisting of Desmodur W, IPDI, and TMDI.
7. The UV-curable adhesive composition, according to claim 1, wherein said poly-functional mercaptan has at least 2 thiol groups.

8. The UV-curable adhesive composition, according to claim 1, wherein said poly-functional mercaptan is selected from the group consisting of  
ethylene bis(3-mercaptopropionate),  
trimethylolpropane tris(2-mercaptoproacetate),  
trimethylolpropane tris(3-mercaptopropionate),  
triethyl-1,3,5,-triazine-2,4,6-trione tris(3-mercaptopropionate),  
pentaerythritol tetrakis(2-mercaptoproacetate),  
pentaerythritol tetrakis(3-mercaptopropionate),  
dimethyl bis(3-mercaptopropyl)silane,  
1,6-hexanedithiol,  
1,10-decanedithiol, and  
3,6-Dioxaoctane-1,8-dithiol.
9. The UV-curable adhesive composition, according to claim 1, wherein said poly-functional mercaptan is a 3-mercaptopropionic acid ester of a polyhydroxy compound.
10. The UV-curable adhesive composition, according to claim 9, wherein said polyhydroxy compound is selected from the group consisting of glycols, propylene glycol, butanediol, hexanediol, cyclohexanedimethanol, glycerol, polyethylene glycol, polypropylene glycol, and polyester polyols.
11. The UV-curable adhesive composition, according to claim 1, wherein said poly-functional mercaptan is trimethylpropane tris(trimercaptopropionate).

12. The UV-curable adhesive composition, according to claim 1, further comprising at least one additive selected from the group consisting of polymerization inhibitors, antioxidants, tackifiers, flow and leveling agents, pigments, fillers, odor-masking agents, and UV-stabilizers.
13. A thiolene composition comprising the reaction product of:
  - a vinyl-ether terminated urethane; and
  - a poly-functional mercaptan, wherein
  - said composition is crosslinked with a curing agent.
14. The thiolene composition, according to claim 11, wherein said curing agent is ultraviolet light.
15. A thiol-ene formulation curable to a crosslinked polymer comprising:
  - a polyfunctional mercaptan; and
  - a vinyl-terminated urethane.
16. An adhesive product comprising
  - a layer of a backing material; and
  - a layer of a curable thiol-ene formulation comprising:
    - a polyfunctional mercaptan, and
    - a vinyl-terminated urethane, wherein said thiol-ene formulation is cured to a crosslinked polymer.

17. A method of using a curable thiol-ene formulation comprising:
  - providing a backing material;
  - providing on said backing material a layer of a curable thiol-ene formulation comprising:
    - a polyfunctional mercaptan, and
    - a vinyl-terminated urethane; and
  - curing said thiol-ene formulation.
18. The method of using a curable thiol-ene formulation, according to claim 17, further comprising applying said formulation with a hot-melt coater.
19. A hot-melt coater containing the curable thiol-ene formulation of claim 1.